The Air Line Pilot

July, August, 1952

Comparison of the Convair 340 and 240

Airworthiness Review

Convair 340
—Page 2—

Comparison of Convair 340 and 240

By L. Homer Mouden

A member of the ALPA Committee which inspected the Convair 340 evaluates the plane for fellow pilots.

Recently, at Convair's invitation, nine Airline pilots from eight domestic airlines who have ordered 340s and a representative from ALPA's Engineering Department spent an interesting week at the Convair factory at San Diego. We were given the opportunity to inspect, fly, and attempt to evaluate the Convair 340, which is now coming off the production lines for delivery to United Air Lines and Braniff Airlines. During that week, an attempt was made to absorb as much information as possible concerning the design, engineering, construction and flight characteristics of the new Convair 340 airplane. While the amount of information assimilated was considerable, it is recognized and acknowledged that some of the opinions formed by the writer will necessarily be subject to change at future dates, as operational experience is accumulated. There has never been a better method of finding and eliminating any "bugs" in an airplane than through scheduled operations. The opinions expressed in this article are those of the writer and not necessarily those of the entire Evaluation Committee, nor of ALPA. They are based, however, on opinions formulated in some fourteen years of flying, and from experiences gained in two years of flying the Convair 240.

The Air Line Pilot

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W. Johnston, Editor

General Characteristics of the 340 are basically similar to the 240. The fuselage of the 340 is 4′ 6″ longer than the 240, and the wing-span is 13′ 11″ greater. The overall height to the top of the vertical fin has been increased by 10″. The increase in overall height and in propeller clearance is due to a longer main landing gear strut and larger main gear tires. The added length of the fuselage of the 340, with an additional window on each side, gives the appearance of longer, cleaner lines than even those of the 240, while the additional 1½° dihedral in the longer wing makes the airplane appear closer to the ground than the 240. Actually, the prop clearance is greater for the same prop diameter than the older model.

The larger tires carrying a lower air pressure are an improvement over the smaller high-pressure tire of its predecessor. These should be more forgiving of poor landings or bad braking technique. They also should give the airplane better handling characteristics on unimproved runways, or on ice and in deep snow. The heavier gear, together with the softer tire, should result in less maintenance on the gear.

The airplane is powered by two Pratt-Whitney R-2800-CB16 engines. This engine is capable of developing the full 2400 horsepower for takeoff at 59½ inches manifold pressure with a reserve of throttle left. This will permit maximum allowable power for takeoffs on hot summer days, or at higher field elevations. This has been found to be a weakness of the R-2800-CA18 installations in the 240s.

Engines drive Hamilton Standard, solid dural, flat tipped propellers of 13′ 6″ diameter through a reduction gear ratio of .45 to 1. The propellers are full-feathering and reversing and are identical in design and installation with the latest propeller installations recently made on the CV-240s by several of the airlines.

A preliminary inspection of the airplane indicates that it was designed and engineered so as to require the minimum of auxiliary equipment at a station. The external power source and CB connections are conveniently combined in one unit, located in the belly near the nosewheel. The airplane can be re-fueled without the need of ladders for getting on the wing. Both the fore and aft cargo doors have built-in flood lights for illumination of the shadow side of the airplane when parked under ramp flood lights.

The airplane is boarded by means of build-in steps, which unfold outward from the left side of the fuselage just aft of the cockpit. The passenger entrance door is hinged at the top and opens upward to form a canopy over the entrance steps. These steps can be raised or lowered either from within the entranceway, or from the outside. This feature permits rapid boarding or deplaning of passengers, and is a very satisfactory means of emergency evacuation from the airplane when the landing gear is extended.

About the Author

Captain Mouden flys for Mid-Continent Airlines, and has been a member of the Safety Committee since its inception. He served as Chairman of the Safety and Engineering Committee of Council 45 for 4 years, and is currently Chairman of the Regional Air Safety and Engineering Committee at Kansas City. Captain Mouden has BS and MA degrees in Science, and was on the staff of Iowa State College for 4 years previous to taking up commercial flying. He has been flying since 1938, and has been with Mid-Continent since 1941.

Circuit breaker panel.

The carry on luggage racks immediately to one's right as they enter the airplane give baggage storage capacity of 85 cubic feet. In addition, there are 152 cubic feet in the forward cargo compartment, 200 cubic feet in the rear cargo compartment, and 78 cubic feet in the belly compartment. The airplane seems to have adequate space for baggage and a sizeable amount of cargo.

A clever innovation for coat storage was accomplished by slanting the forward cargo wall inward slightly at the top and installing rows of tandem coat-hanger hooks on this wall. They are hidden from sight and protected from dust by means of a curtain on a traverse rod. The coats are easily stored by the cabin attendants, and can be conveniently and quickly distributed while the passengers are deplaning.

Cabin is basically the same as the 240, with the addition of one extra row of seats—making a total seating capacity in the cabin of 44 passengers. The bulkhead arrangements, galley and lavatory are essentially the same as those 240s with integral forward loading doors.

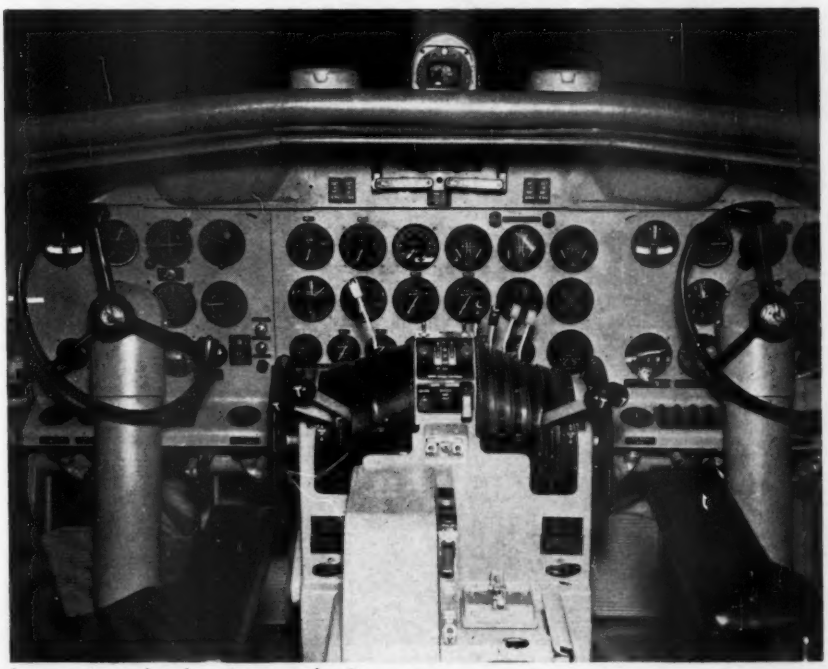
Upon entering the cockpit, those pilots who had not previously been flying CV-240s were immediately impressed with the wonderful visibility from the cockpit. After having been flying the 240-2 with indirect instrument lighting and without the larger glare shield such as is used in some models of the 240, it seemed as though the visibility had been reduced some by the direct lighting glare shield. However, pilots familiar with this glare shield installation, as used in the AAL 240s, are well pleased with it, and thought the visibility in the 340 was equally good. It has the best visibility, in my opinion, of any airplane in airline use today. This may be due in part to the ALPA Committee's suggested changes to the original cockpit mock-up of the 240 during design stages. This amplifies the importance of pilot participation in airline transport design.

It is difficult to evaluate a new cockpit with only a cursory inspection, as the use of various items in relation to other items within the cockpit is best determined by on-the-line experience. The basic cockpit arrangement is good. The cockpit seats in the 340 are comfortable, and have adequate adjustments. It appeared to have greater fore and aft limits in seat adjustment than does the 240, which is an improvement; but I was of the opinion that another additional inch forward adjustment would have been desirable to give maximum accommodation to pilots of all sizes.

The cockpit noise level is even lower than the 240. The cockpit speakers that were installed in the UAL model were very readable, and conversation between pilots was conducted at near normal voice level. Convair is to be commended for this feature. It seemed as though they had been more successful in further lowering the noise level in the cockpit than they had been in the cabin. The cabin did not get a fair test, however, as most of the seats were removed to accommodate ballast, which necessarily changed the acoustics considerably.

The airplane has been electrified even more so than the 240, which has resulted in additional "control panels" within the cockpit. The crossreed valve is now electric, thus making the fuel system completely electrified, with all the controls installed on an overhead fuel panel. This produces the usual pilot concern over "non-manual" controls of such vital operations of the airplane. However, it is recognized that cables have been known to operate valves and controls due to deformation of the airplane structure during a crash landing.

The installation of additional electric equipment has brought the location of the feathering buttons overhead a little farther aft in relation to the pilot's position. This has placed them in an even less desirable location than in the 240s. In the pilots' opinions, the logical location for the feathering buttons is on the fire-control panel located immediately above the center instrument panel, and just under the glare shield. There they would be conveniently available without danger of being tripped accidentally. The pilots are bringing this item to the attention of their respective companies, with



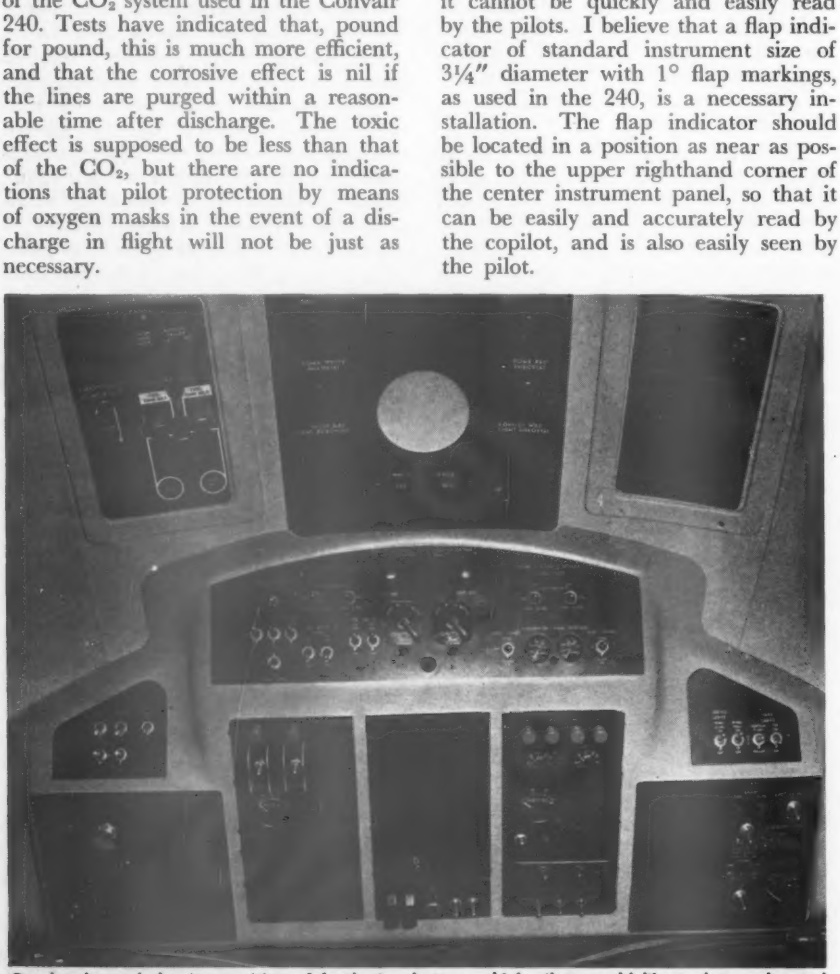
Instrument panel and engine control unit.

good prospects of effecting a change to the proposed location. This would make the "lights out" check of the buttons on takeoff much easier, and would permit the co-pilot to keep his vision forward instead of looking toward the top of the cockpit at the start of the takeoff roll. They would be under observation at all times, and would be accessible by a simple reach of the hand rather than to require a full-arm sweep to reach them, as is common with the feathering button installations in most airline airplanes. The original idea of installing feathering buttons in as inaccessible a spot as possible, to prevent them from being activated inadvertently, has long been known to be outmoded and absurd. Prop feathering is definitely a part of fire control in an engine, and the feathering controls should be treated accordingly.

The airplane fire extinguishing system utilizes chlorobromo-methane (or CB, as it is commonly known) instead of the CO_2 system used in the Convair 240. Tests have indicated that, pound for pound, this is much more efficient, and that the corrosive effect is nil if the lines are purged within a reasonable time after discharge. The toxic effect is supposed to be less than that of the CO_2, but there are no indications that pilot protection by means of oxygen masks in the event of a discharge in flight will not be just as necessary.

Controls on the throttle pedestal are convenient and easily accessible. It would have been an improvement, however, if the controls on the throttle pedestal had been rearranged so that the mixture controls were separated from the carburetor heat controls to prevent accidental pulling of the mixture when reaching for the carburetor heat, as has been known to occur on the 240s. This could have been accomplished by installing the mixture controls on the left side of the pedestal inboard of the pilot's throttles, where there is now a vacant space not utilized by the new auto-pilots.

The instrumentation, as observed on the UAL model, seemed convenient and satisfactory with the exception of the flap indicator. I am of the opinion that flap management is too important a feature in the proper handling of the 340, or any other modern airplane, to have the flap position indicated by so small an instrument located in the lower center instrument panel, where it cannot be quickly and easily read by the pilots. I believe that a flap indicator of standard instrument size of 3¼" diameter with 1° flap markings, as used in the 240, is a necessary installation. The flap indicator should be located in a position as near as possible to the upper righthand corner of the center instrument panel, so that it can be easily and accurately read by the copilot, and is also easily seen by the pilot.



Overhead panel showing position of feathering buttons which pilots would like to have relocated at a point below glare shield.

The standard installation of oil quantity gauges on the instrument panel was a highly desirable feature. This item has been long advocated by the pilots as a necessary installation in order to correlate engine oil consumption with fuel consumption. Another standard installation item is the fuel flow meters. These in conjunction with accurate fuel quantity gauges give a much closer check on engine operation than by checking fuel gauges only.

The integral loading door on the forward lefthand side is standard on all models. The service door and the rear cargo doors are in the same places as on the Model 240. The 340 has an additional forward cargo loading door opposite the passenger entrance. The door latching mechanism and the door seals have been changed completely in design from the 240. The bayonet locks that held the outward opening doors on the 240 have been eliminated. All doors, except the galley service door, are hinged at the top and open outward from the bottom. The doors are held shut against pressure by means of forged, steel latching hooks. The door forms a section of the hoop construction which comprises the fuselage and is held shut by the "stretch wrap" principle. The manufacturer indicated that one latch was adequate to hold the door shut under full pressure differential. While the latch system has obviously met required tests by a safe margin, I personally have faith that the bayonets cannot come out under pressure, whereas latches might crystallize and break under the maximum tension of full pressurization differential. However, the latches are readily inspected, both on the ground and in flight; and with proper inspection and maintenance, the doors should be trouble-free. From a maintenance standpoint, the 340 latches should be a big improvement over the 240, as the bayonet locks have required considerable maintenance to keep them adjusted.

More Convair
340 Photos—Pages 8-9

The door seal is accomplished by a novel and basically simple means. The rubber seal consists of a diaphragm-like formed seal with vent holes on the inboard side. The door can be closed easily when not under pressure, and yet as soon as the pressure starts to build up in the cabin, the pressurized air enters the holes in the seal and inflates it, effectively closing the opening. If the seal becomes broken or torn, it can be repaired by means of

Lower left side cockpit wall showing emergency landing gear up latch release, nose wheel steering, and emergency air brake knob.

a simple cold patch or can be readily replaced. This should have a long service life, and should give a minimum of difficulty.

The 340 is designed for maximum pressure differential of 7 p.s.i. and will be pressurized to a maximum differential of 4.15 p.s.i., as against the 3.25 p.s.i. differential on the 240. This increased pressurization differential is definitely an improvement over the 240, which has been penalized at times by its high speed in relation to its low cabin pressure differential — thus preventing the maximum utilization of airplane performance and efficiency on some short hauls.

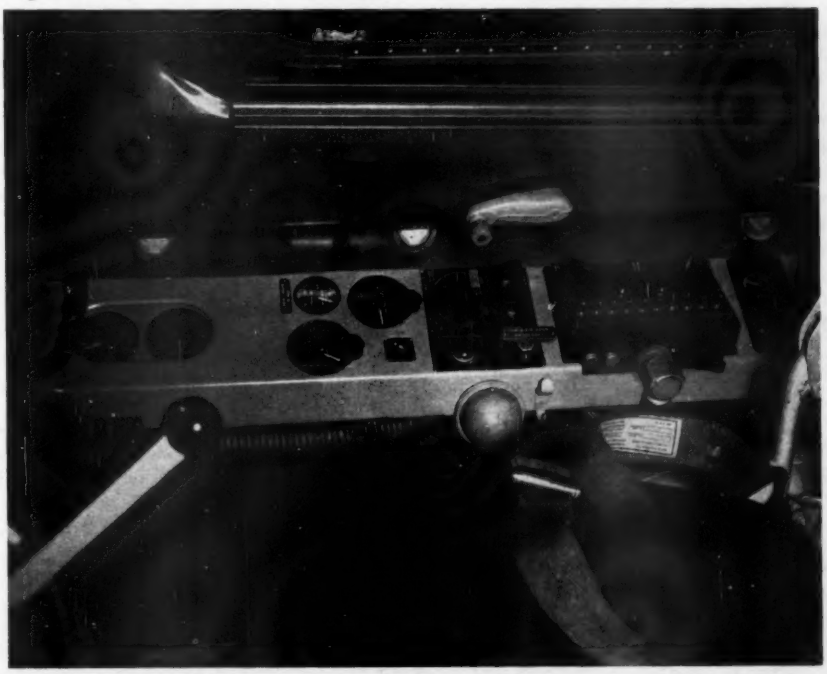
The pressurization compressor is installed on the accessory section of the right engine. A very commendable feature of this installation is that, during the takeoff, with the auto-feathering system armed, the compressor is automatically disconnected upon an indicated loss of power of the left engine sufficient to trigger off the auto-feathering system. For cruise this feature is connected into the manual (normal) feathering system. This permits quick recovery of the 75 horsepower required to drive the compressor for use during single engine operation.

The Flap on the 340 has been increased in span by 14.51 feet. There is a double flap installation on each side. The inboard flap starts approximately 15 inches from the center of the fuselage and runs to the outboard side of the wheel nacelle. The outboard flap reaches from this point to the aileron.

The inboard flap extends to 45° full travel while the outboard flap is extending to 40° full travel. This is accomplished by means of a common torque tube upon which are mounted cable drums of different sizes. The flaps are activated by means of two electrically controlled, hydraulic motors interconnected by a torque tube. A torque-sensing assembly is mounted on the interconnecting torque-tube between the two motors. This automatically shuts off electrical power to the hydraulic motor solenoid valves in the event excessive torque is applied to the interconnecting torque-tube, through the failure of one flap motor, or binding in the flap assembly. This prevents inadvertent extension or retraction of the flaps on one side and not the other. This is a very desirable feature on the 30, and for all airline airplanes, and should be practically foolproof, barring the actual mechanical failure of the interconnecting torque-tube linkage.

The flap management on the 340 is basically the same as on the 240. The airplane will not be certificated for zero flap takeoffs. The throttle warning horn is interconnected with the flaps, so that if an attempt is made to open the throttle for takeoff without the flaps extended, the horn starts sounding intermittently. Such "reminder" devices are indications of sound cockpit engineering. The manufacturer's tests indicated that it would be possible to maintain aileron control with the flaps on one side fully extended and the other side fully retracted.

(Continued on Page 13)



Lower right cockpit wall showing cabin pressurization controls.

Air Worthiness Review

The August 4, 1952 Annual Airworthiness Review Meeting drew representatives from all branches of the air industry to review Civil Air Regulations relating to aircraft design and operation. Following is a report on the meeting by ALPA Engineers T. G. Linnert and C. F. Eck.

The Airworthiness Review Agenda included subjects embracing all phases of the industry. The conference enabled all interested parties to discuss, with the Federal agencies, proposed regulations or proposed revisions to regulations which had accumulated over a period of time. The meeting was not for the purpose of making on the spot regulations but rather to gather information to ascertain the need for new or revised regulations.

All the information presented and the minutes taken during the nine day meeting are to be reviewed by the CAB, and where substantiated, new regulations or revised regulations will be adopted. Prior to the adoption of any proposed new or revised regulations, they will be distributed to the industry in their usual Draft Release form so that comment and criticism may be made prior to the final adoption of any regulations. Considered of particular interest to the air line pilots were the following subjects:

Pressurized Aircraft Ventilation was sponsored by ALPA by Captain Vernon Peterson of Eastern Air Lines. Captain Peterson made a survey by questionnaire of the air line pilots' health and fatigue experience when flying pressurized transport aircraft. Captain Peterson, after citing a number of summaries and statistics from the pilot questionnaires made the following proposals for study and regulation:

—That the current specification of 10 cubic feet per minute per crew member be increased to 30 cubic feet per minute.

—That the present requirement with regard to carbon monoxide is not realistic and such concentrations result in pilot fatigue.

—That the oil vapors emitted from the blowers be eliminated.

—That the ventilating air intake be in the pilot compartment and the exhaust be at the rear of the passenger cabin.

—That the cabin pressure altitude should not be greater than 5,000 feet.

—That smoking be prohibited in high density airplanes unless recommendation 4 is complied with.

—Improvement in humidity control.

—No recirculation of ventilating air into the pilot compartment.

Ditching Provisions. Captain J. C. Burn, ALPA Representative on the CAA Committee working on emergency evacuation problems, proposed many changes both in design regulations and operating procedures to better provide for survival after an unplanned ditching.

Captain Burn, from past experience, stressed the need for better stowing of life rafts and recommended modifications to stow life rafts either within the aircraft fuselage or some exterior location, so that the clumsy, heavy rafts would not have to be carried and launched by a crew member. Other recommendations were for all transport aircraft to have an independent system of dry-cell lights located so as to illuminate emergency exits and provide illumination around the aircraft after ditching or during an emergency landing on land; that all transport type aircraft provide some sort of life preserving means—possibly upholstered seat cushions in the event that an aircraft, upon being forced down, may be ditched in an inland body of water or river in preference to a forced landing on rugged terrain. Under such conditions, if a forced landing is inevitable, better survival can be obtained by ditching and evacuating of the passengers into the water; with some sort of life preserver available to them. In general, the aircraft industry believed the objectives of the ALPA items are sound and recommended further study toward possible promulgation of regulations at a future date. Discussions revealed there are considerable activities toward means of better procedures and equipment throughout the industry.

Pilot Compartment Visibility was placed on the agenda by the Air Line Pilots Association and requested the establishment of definite minimum windshield visibility requirements of sufficient area, and that windshields be free of distortion, fogging, and have adequate de-icing provisions. The pilots objective is to reduce collision hazards and have good windshield characteristics for landings during adverse weather conditions.

ALPA had previously worked in cooperation with the CAA to formulate a questionnaire on windshield study to provide data for the CAA Windshield Evaluation Project at the CAA Technical Development Center at Indianapolis. Currently the CAA is working toward having their windshield evaluation project completed by the fall of 1952, and at that time would have some recommendations for amendments to present windshield design requirements.

Cockpit Standardization. Extensive work has been done by an Industry Committee set up by the SAE. Discussions revealed that the SAE Committee on cockpit standardization is making progress and that the Munitions Board concurred with the Recommendations of the SAE Committee with the exception of a few minor details. After considerable discussion the matter of cockpit standardization was closed with the understanding that no conclusions could be reached at this time and that further activities should continue.

Cooling Tests were sponsored by the CAA and proposed an amendment to current regulations toward requiring more adequate engine cooling requirements. Discussions of the subject revealed that pilots, flight engineers, and the ATA are in favor of improved engine cooling for scheduled air carrier operation. Indications are that the CAA proposal received considerable support and that the subject would be further explored.

Crash Resistant Fuel Tanks was an item of industry-wide interest and was reviewed at the meeting to bring industry representatives up-to-date on the status of studies and tests that have been going on for some time on this subject. The CAA has the project of testing crash resistant fuel tank designs underway at the CAA Technical Development Center at Indianapolis. Re-

search had been going on for several years and indicates that some concrete results toward designing crash resistant tanks are in evidence. The CAA technical experts working on the project pointed out that there is now more optimism toward resolving this important design problem in the near future.

Propeller Reversing Indication. CAA proposed the following:

"Means shall be provided to prevent the application of power in forward thrust when the pilot intends to apply reverse thrust."

Industry observers pointed out that it is possible that the intent could be carried out by a design which would prevent pulling the throttle back if the propeller did not reverse.

ALPA pointed out that a visual indicator would be very beneficial to the pilot when failure of the propeller reversing system occurred without any movement of the throttles. Industry people agreed that there was a need for propeller reversing indication but did not feel that there was a specific proposal developed which they could approve at this time. The CAA said they would make a more specific proposal and send it to the industry for comment.

Fire Warning, Extinguishing, and Prevention. Discussions at the industry meeting centered around smoke detection and electric circuits in fire zones. Fire protection in baggage compartments received much discussion. Since the subject is one of research and development the matter was deferred until the 1953 Annual Review with the thought in mind that a time period would permit formulation of new regulations in view of added experience and test data.

Aircraft Exterior Lighting Improvements. This is an ALPA sponsored item where the pilots stress the need for brighter navigation lights and the requirements for an adequate anti-collision light. The pilot group stresses the immediate need for these airplane exterior lighting improvements for the prevention of collision during the hours of darkness or conditions of restricted visibility. The pilots pointed out that the subject had been in research for a long time and that improvements are needed NOW, even though, perhaps, the optimum in aircraft exterior lighting had not been found. Pilots pointed out that this subject has almost reached the point of delay as has the airport approach light system subject. The optimum is always being sought when a great improvement is already on hand that would do the job, and should be used until a better light is developed.

There was general agreement with the ALPA recommendations for improved exterior lighting of the aircraft. ATA pointed out that several carriers were voluntarily installing an anti-collision light for evaluation purposes. ATA representatives indicated that probably 300 air line aircraft would be equipped with improved exterior lighting during the forthcoming winter and that such a number would be sufficient to determine the need for, and phrasing of a regulation on the subject. After considerable discussion there was general agreement that the proving period of the present developments in aircraft exterior lighting should be conducted during the forthcoming winter and that a regulation written for retroactive installation of improved exterior lighting means for transport aircraft should come about after a winter's evaluation of the newly installed lights.

Air Worthiness Participants

—Wm. W. Moss, Jr., PAA Council 36; Vernon Peterson, EAL Council 51; J. C. Burn, PAA Council 17; T. G. Linnert and C. F. Eck, ALPA Engineering and Air Safety Department.

—Ben O. Howard, Convair (ALPA inactive status, charter member No. 46.)

—W. T. Dickinson and R. S. Shevell, Douglas

—Phil Coleman and E. A. Peterman, Lockheed

—E. W. Noris and R. E. Bateman, Boeing

—W. W. Davies and A. M. Salmon, United Air Lines

—D. G. Beard and H. E. Hoben, American Air Lines

—H. C. Archer, National Air Lines

—P. W. Blake, Pan American Airways

—F. E. Davis, Eastern Air Lines

—H. M. Thorson, Northwest Air Lines

—A. W. Dallas and D. B. Talmadge, ATA

—I. C. Peterson, AIA

—W. D. Kent, FEIA

—G. W. Haldeman, R. B. Maloy, Omer Welling, S. Rolle, and D. Posner, CAA.

—Dr. B. G. King and P. C. Spiess, CAA

—J. M. Chamberlain, H. Freeman, G. Prill, W. E. Konecsny, B. C. Doyle, and O. Bakke, CAB

New Performance Requirements. Ray Maloy, Chairman of the Transport Category Performance Re-evaluation Committee, reviewed the background of the activities of the Committee studying new performance requirements. The task of the Industry-wide Committee is to re-evaluate the present performance requirements. Four papers on the subject were reviewed by the CAA to bring the industry representatives attending the meeting up-to-date. In his concluding remarks Mr. Maloy stated that there was an excellent chance that the performance re-evaluating working group will complete their study toward the end of the year and will have a proposal ready for the industry to study and criticize. The proposal, upon being forwarded to the industry sometime in December, would allow time for being placed on the Agenda for the 1953 Annual Review Meeting.

Increased Performance Levels. Captain Wm. W. Moss, ALPA's Representative on the CAB-CAA working group on performance had prepared a paper titled, "Analysis of the need for temperature and humidity accountability for take-off and initial climb of transport category airplanes." This paper was distributed and reviewed by Captain Moss. The report contained an analysis of how adverse weather conditions affected climb performance of a transport category airplane.

In addition to the report Captain Moss explained to those present how strongly the pilots felt about the marginal performance they were experiencing during hot and humid weather conditions. This continued concern of the air line pilots was the reason for again bringing up the subject for industry attention.

Although headway is being made by the industry group studying performance, there is every indication that considerable delay will occur before an evaluation of the new proposed regulations for performance will be adopted for scheduled air carrier use.

ALPA believes immediate action should be taken toward insuring that a safe level of performance is available. CAA agreed with ALPA and pointed out that the CAA had, at last year's meeting, made a specific proposal to the CAB that would further take into account temperature and humidity accountability. The CAA also stated that it would be willing to cooperate if the CAB feels there should be an interim requirement with regard to temperature and humidity.

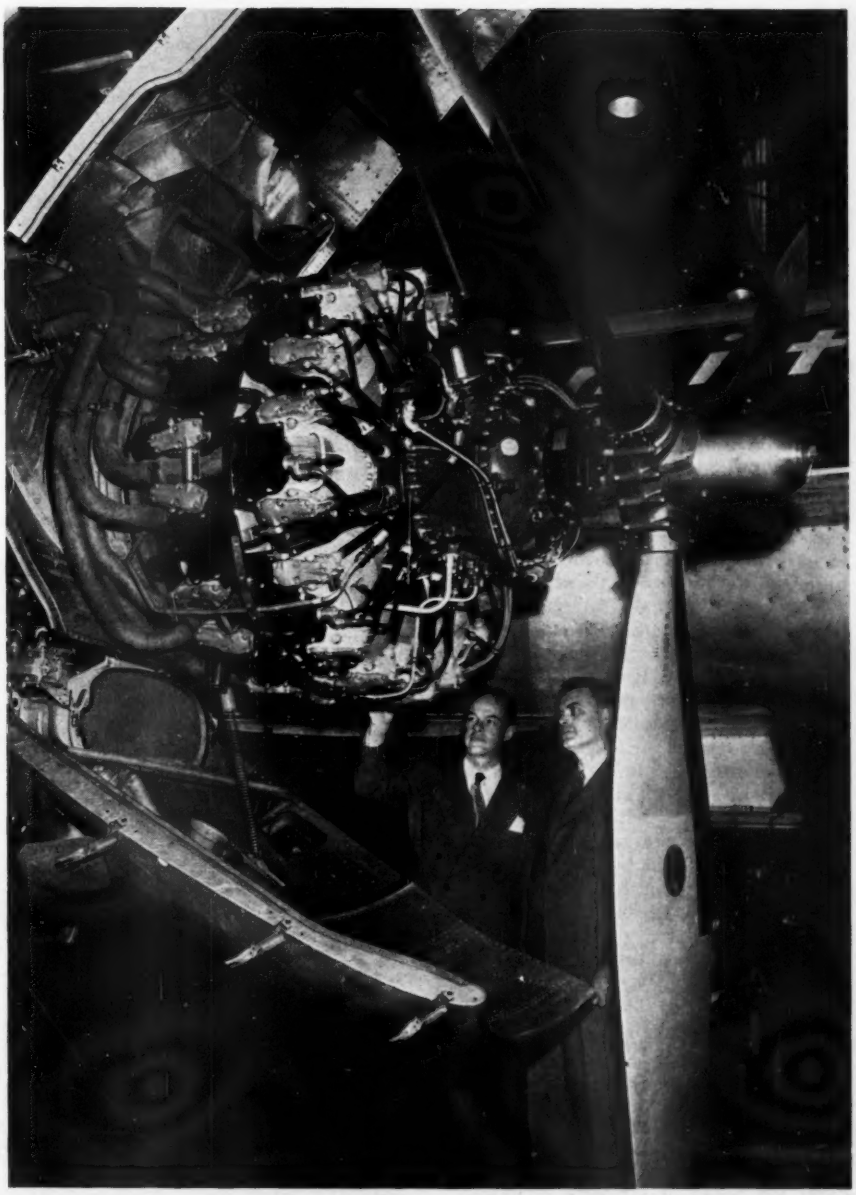
(Continued on Page 12)

Camera

Convair 340 on the line (see page 2).

One engine inoperative take-off demonstration.

Interior.



Easy engine accessability made possible by cowl design feature.

News

Navigation Light

A high intensity rotating red navigation light (see cut) has been developed by United Air Lines.

Installation of the new light on all United's planes is underway at the company's maintenance base, San Francisco. Reports indicate that it makes aircraft distinguishable at night at distances up to 25 miles.

The light is mounted under a red plastic dome on the uppermost tip of vertical stabilizers. A sealed beam, 100-watt lamp of approximately 18,000 candlepower is the source of illumination. Two reflectors, suspended over the lamp, are revolved by a motor at 40 r.p.m.'s. The assembly is extra sturdy to withstand vibration.

Two beams emanating from the lamp rotate 360 degrees to provide complete coverage within the critical area about the horizontal plane. One beam covers an area between 20 degrees above and 20 degrees below the horizontal. The other, of higher intensity, covers an area between 5 degrees above and 5 degrees below the horizontal.

Two flashes occur per revolution, one more brilliant than the other. An observer above or below the horizontal sees only one flash per revolution. When viewed at approximately the same altitude, the flashing rate doubles.

The light assembly weighs slightly more than two pounds. It is about 4½ inches in diameter and 7 inches high, including the mounting ring. Installation atop the tail has no appreciable effect on aerodynamics and also guards against interference with vision through reflection in fog or clouds.

The light will be wired in with the navigation lights of United's planes. An additional connection to a micro-switch on the landing gear will turn off the light while the plane is on the ground.

Research which resulted in the new light began in 1948.

General Electric cooperated in the project by designing a 100-watt double-reflector sealed beam assembly. A prototype of the new light was demonstrated before members of the Flight Safety Foundation at Denver in October, 1950. Further refinements were made and service testing on six DC-6 Mainliners began last summer.

Comments on the new light from the flight log books of United's pilots follow:

"Plane coming in behind us reported light clearly visible at least 15 miles away."

"Tower reported we were clearly visible to them at all times on a 360 degree circuit of the field."

"Another plane reported light clearly visible while following us through cloud layers."

"Rotating light showed clearly from Saratoga to Evergreen. Tonight we could see you from a great distance but didn't see another plane until we were right on him."

"Light visible 10 miles in clear air and full moon."

"Could see lights on trip 618 at a distance of 20-25 miles."

"OMA tower reported light visible at 25 miles."

"Tower reported light visible when radar showed plane 22 miles away."

Douglas Unveils Jet Transport Mockup

Douglas Aircraft Company is exhibiting a full scale fuselage Mockup of the four-jet DC-8 in Santa Monica. Douglas executives say they are aiming at capturing the jet transport market through a privately financed program. The cost estimated to launch the DC-8 has been pegged at from $30,000,000 to $40,000,000.

The DC-8's basic design calls for a long wing monoplane with a 35° sweepback. Power plants will be four Pratt and Whitney J57 Turbo-Wasp with ratings in the fifteen-thousand lb. thrust class. The low fuel consumption of these split compresser Turbo Jets make them attractive for commercial operation. The engines will be mounted in individual pods slung under the forward of the wing.

DC-8's specifications:

Wing span is approximately 127 ft. with fuselage length approximately 134 ft. A single fin empennage also incorporates a 35° sweepback.

Two versions of the DC-8 are planned. The domestic airline operations plane will gross about 180,000 lbs. The other will have a 220,000 lb. gross fitting for long range over-seas operations.

A cruising speed of 560 mph at 40,000 ft. is expected. The international version will have its range extended by two wing tip tanks of approximately 600 gallons capacity each.

Landing gear is a four wheel bogie type located inboard from the engine pods. It will fold inward into the fuselage and wing root.

CAA Hampered by Appropriation Cuts

Due to its budget for fiscal 1953, the Civil Aeronautics Administration says there will be no money for construction of new airway facilities or new airports and major personnel cuts will result.

A mechanic inspects the new rotation navigation light which UAL is installing on all planes. Light weighs just a fraction over two pounds, and has been observed at distances up to 25 miles.

The Picture:

—Airways: No money for establishment of facilities in 1953. The $11,091,499 appropriated for this purpose represents an $11,408,501 cut over 1952 and all money must be used toward completion of programs begun in 1952 and for improvements, modifications and modernization of existing facilities.

—Technical Center: CAA's Technical Center at Indianapolis faces a 10 per cent personnel layoff. Some projects will have to be dropped.

—Washington Office: Administrative, developmental, information and staff activities will have to crawl along without approximately 150 people.

—Federal Airport Program: Personnel to be cut, no new construction to begin.

Air Safety

Several steps were taken toward increased air safety during the past two months:

—Emergency Evacuation: The CAA-Industry group on emergency evacuation problems met July 9, 1952, in Washington. ALPA requested that "survival after an emergency ditching" be included in studies by the appropriate committee. The discussions concerned a program of tests to determine the value of current ditching procedures and equipment.

—Safety Conference: The First Scheduled Air Line Flight Safety Conference was held July 10, 1952, in Washington. Object of the Conference: To consult informally on industry-wide safety problems. Attending for ALPA: John Payne, EAL; L. N. Jack, PAA; J. C. Burn, PAA; T. G. Linnert and L. Cates, ALPA. The next meeting has been set for September of this year.

No New Airports in '53

No funds have been allocated to the 1953 Federal Aid Airport Program for new airport construction.

RAWB Conferences

Airline labor representatives and airline officials have been invited to attend regional conferences to be held by the Railroad and Airline Wage Board in seven major cities between September 12 and October 1.

The meetings will include a general presentation of stabilization policy as developed to date, and explanation of the specific regulations and interpretations which have been issued or adopted by RAWB, and a discussion of compliance problems noted by the Board in processing cases. Representatives of labor and the carriers will have an opportunity to discuss particular problems involving their own operations.

ALPA will attend the September 12 meeting in Chicago.

Extension of Pilot Rule

The Civil Aeronautics Board is proposing to extend the authority of Special Regulation 381, which expires September 30, 1952, and provides authority for a pilot to serve in more than one type of flight crew without incurring penalty against his maximum permitted flight duty. Some carriers have requested that the provisions be incorporated in CAR 41, but the Board feels extension of the regulation is more advisable.

Court Case:

Following is a chronological list of occurrences leading to and subsequent to the court case titled, "Talton, et al vs. Behncke."

—June 12, 1951: Behncke called an emergency Executive Board meeting.

—June 15, 1951: Executive Board, in session, appointed a sub-committee to investigate ALPA's affairs. Board voted to recess until sub-committee report was prepared.

—July 1, 1951: Sub-Committee notified Behncke that their report was ready. Behncke refused to call Board into session.

—July 11, 1951: Executive Board reconvened and notified Behncke who refused to appear. After hearing sub-committee report the Executive Board convened the Board of Directors for July 16, 1951.

—July 16, 1951: Behncke asked Federal Court to enter judgment against pilots in amount of $2 million and that injunction be issued to "perpetually enjoin" them from holding a Board of Directors meeting; operating Headquarters; using ALPA funds. Suit was filed in name of several pilots. Case referred to Master LaRue.

—Board of Directors met. Behncke, despite notice, refused to appear. Board amended by-laws and recalled Behncke from office of ALPA Presidency.

—July 18, 1951: Behncke stated before Master LaRue that he was withdrawing suit, and would not interfere with ALPA operation. His attorney was to file withdrawal paper next day.

—July 19, 1951: Behncke's attorney failed to appear to file withdrawal papers. Behncke refused to relinquish ALPA offices or funds and attempted to act as President.

—July 23, 1951: 8 members of Board of Directors and Executive Board asked the Federal Court to restrain Behncke from interferring in ALPA's affairs.

—July 30, 1951: Hearings before Master in Chancery Victor E. LaRue began.

—May 20, 1952: LaRue's report said Board of Directors' action was legal and valid; recommended Behncke's ouster be upheld and Behncke restrained.

—June 25, 1952: Federal Judge Walter J. LaBuy issued a report reversing Master LaRue's recommendations.

—July 14, 1952: Federal Court issued findings of fact, decree, and order reinstalling Behncke as ALPA President, ordering ALPA to pay all court costs, and enjoining pilots from interfering with Behncke's activities as President.

—July 31, 1952: Judge Walter C. Lindley, Circuit Court of Appeals, issued a Stay Order suspending Judge LaBuy's decree, and returning the operation of ALPA to *status quo:* ". . . it being the intent hereby to preserve and continue the status existing in said cause *immediately prior to entry of said decree* and until this Court shall otherwise direct it . . ." Behncke contended he did not understand the Stay Order.

—August 7, 1952: Pilots' attorneys asked Judge Lindley for a contempt citation against Behncke for failing to abide by the Stay Order. Judge Lindley gave Behncke's attorneys until August 15, 1952, to show cause why Behncke should not be held in contempt of Court.

—August 21, 1952: Court of Appeals found Behncke in contempt for failing to abide by Judge Lindley's Stay Order. Court set Hearing on Appeal for September 29, 1952.

***The Air Line Pilot* welcomes comment on its editorial content**

Pilot Advertising

This issue of the Air Line Pilot carries paid advertising for the first time in the history of the publication. The action is a result of a resolution by the Sixth Executive Board in which the Board decreed that advertising should be accepted to "help defray the cost of publication." The action was later approved by a ballot of the Board of Directors of the Association.

Air Worthiness

(Continued from Page 7)

Preflight Performance Information. CAA recommended specific provisions be made to inform the pilot prior to take-off of the following values for the particular runway intended for take-off plus at least one alternate runway when available:

a. V_1 speed
b. V_2 speed
c. Limiting wind and temperature
d. Flap setting
e. Wet or dry power
f. Take-off weight

This recommendation was made because, (1) some carriers under-emphasized their factors in their pilot training program, or (2) make inadequate provisions for informing the pilot of the pertinent values even under limiting runway conditions. It is not rational that aircraft be operated at weights which are obtainable only by full implement of the many variables of V_1 and V_2 speed, flap settings, temperature, gradients, and weights, without pilot cognizance of each critical take-off of the values which have made these weights possible.

Some operators did not believe this question was a fit subject for regulation and that the information was available in the cockpit. They feel V_1 was based on dry runways and operations during the winter months and carried out on wet, snowy, icy runways and therefore V_1 has no significance under the latter conditions.

ALPA agreed with the CAA's proposal in principle, but not as a requirement on the clearance form. The question was raised whether a change in the preflight clearance would be required with a change in the weather conditions. ALPA suggested that a better way of handling this information would be by means of a pilots checklist requiring the pilot to check this information. Much of the information and its use must be left to the judgment

As a Matter of Fact

As a Matter of Fact columnist Ronald L. Oakman was unable to file a column this month due to the overwhelming amount of work which has accumulated in his department. As a result, your Editor has been forced to go to work. Mr. Oakman's thoughts will again appear in the next issue of the Air Line Pilot.

Editor

We were sitting home one evening last week trying to get what we felt was some well deserved rest . . . watching TV with one eye . . . reading the local newspaper with the other . . . and munching popcorn. We felt pretty cozy and contented. At just about the moment we conclusively decided all was really right with our little world, the TV announcer passed on some information to us which made us squirm a bit in our overstuffed chair.

The announcer was urging us to get out the vote come election day. Then he gave us some statistics on the number of people in the U. S. who have the right to vote . . . but don't take advantage of that right. We don't remember the exact number . . . but it was large enough to give us quite a start. The announcer's closing statement really shook our complacency. He said, "You deserve the kind of government you have. . . . You elect your leaders." We spilled popcorn all over the living room floor.

About that time, we felt a distinct rumbling between our ears . . . we began thinking. "There is a man," we said to ourselves, "who has a point." If we elect our leaders, then upon our judgment rests the burden of selecting either able or incompetent men. And we began wondering if perhaps that theory doesn't apply also to a labor union.

Just figuring it out in our head, we supposed that unions probably got a great deal of their early nourishment from our country's most precious commodity—democracy. Unionism has helped give men a fair share of the profit they create for their employer . . . good working conditions . . . and a high standard of living. We couldn't imagine free unionism existing under a dictatorship. So, we figured . . . If unionism is an outgrowth of democracy . . . then unions have a moral debt to follow the concepts of democracy in running their business.

"Just suppose," we said to ourselves, "such a thing as a dictatorship existed in a labor union?" We even thought up a title to fit the head of such a dictatorship. We referred to him as a "labor boss." We have a way with words and catchy phrases. Suppose, we said, there was a person heading a union who used the office as a method of preening his own ego. Someone who used the prestige, power and finances of the office as a method of catering to his own whims. We realized that in a democratic organization it was improbable that such a thing could happen . . . but sitting there in our chair, we supposed . . . and it was pretty frightening. The result would probably be that the members of the union would not be getting the representation they were paying for . . . it would probably mean that the organization would eventually lose its effectiveness . . . it would probably dissipate its resources—despite the best efforts of its members.

But whose fault would it be? We wondered. If all that power was put into our hands . . . would we have the will power to use the office rightly? Maybe we would, maybe we wouldn't. Power effects men differently. Give one man a load of bricks and he'll build a house . . . another man will build a monument to himself. Some men just aren't big enough to handle power. But if those kind of men consistently prove their inability . . . yet other men continue to put that power into their hands . . . who is to blame if the power is used wrongly.

It's a pretty big question, we figure. And we plan to do a lot more thinking about it.

W. J.

of the pilot. One of the most variable items which are subject to substantial change between preflight clearance and take-off is the wind which could change the runway originally selected to be used. It will still be the responsibility of the pilots to check these items. This is a subject that can be taken up individually with individual companies if necessary.

Aircraft Engine Endurance Test. The CAA proposed to revise regulations to the extent of prescribing 200 hours of test operation in place of 150 hours currently called for in the regulation for type certification of large aircraft engines. The CAA took the position that increased amount of hours run at high power settings would increase reliability of the engine in scheduled air carrier operation. There was some disagreement between the engine manufacturers' representatives and the CAA on just how much increase in the test time should be made. Industry contended that a mere extension of the hours of testing at cruising speed on the test stand is not as important as modernizing the nature of the test run. CAA succeeded in gaining some concessions from the manufacturers as to the need of additional test requirements and it is believed that more exacting test requirements will be forthcoming shortly.

Airspeed System Calibration For Ground Effect. The ATA proposed that regulation amendments should be made requiring the airspeed system to be calibrated for the ground run. The basis for their proposal was the error during the ground run in airspeed systems of various aircraft presently certificated. Due to this error the pilot does not know exactly when he reaches V_1 or V_2. ALPA pointed out that a two-knot error in terms of runway length could amount to as much as 500'. Industry observers recommended that airspeed indicators and altimeters should have static openings in such a position so as not to induce additional errors during take-offs and landings. It was the opinion of those present that the CAA proposal for an amendment to the regulation which would require a calibration to the airspeed system during ground roll should be made to take into consideration appreciable error during that part of the take-off operation.

Military Services. This year's Annual Airworthiness Review Meeting increased participation of personnel from the military services, namely Coast Guard and MATS. The Coast Guard personnel contributed greatly in discussions on recommendations for emergency evacuation equipment and procedure information. The MATS contributed substantial information in regard to operation and performance requirements. It became apparent that these two sections of Government aviation activities are in some cases advanced over commericial operation and the industry would do well to become more closely associated with them to obtain a maximum of safety during emergencies and methods of operation.

Air Line Pilots Association Federal Credit Union Financial and Stastical Report July 31, 1952

BALANCE SHEET

Assets

	July, 1952
Loans	$285,655.11
Cash	44,174.79
U. S. Bonds	238,660.95
Furniture and Fixtures	2,795.26
Prepaid Expense & Misc.	157.51
Total	$571,443.62

Liabilities

Shares	$546,281.61
Reserve for Bad Loans	8,809.46
Undivided Profits	4,421.91
Profits	11,715.66
Accounts Payable	214.98
Total	$571,443.62

STATEMENT OF INCOME & EXPENSE

(Year to Date 1952)

Income

	July, 1952
Interest on Loans	$ 3,013.65
Investment Income	
Other Income	.59
Total	$ 3,014.24

Expenses

Employer's FOAB	$ 13.70
Other Salaries	1,132.77
Office Supplies	59.03
Educational Exp.	
Loan Insurance	224.45
ALPA Retirement	
Depreciation	101.67
Legal & Coll. Exp.	
Postage	157.68
Misc.	
Total	$ 1,689.30
	$ 1,324.94

Statistical Information

	July, 1952
Number of Members	2,116
Number of Potential Members	10,349
Loans made since Organization (Number)	1,814
Loans made since Organization (Amount)	$1,197,092.82

Convair 340 . . .

One of the most encouraging and satisfying sights to the Committee was watching the machining, construction, and assembly of the wing. After watching the manufacturing of a wing assembly, from the milling of the top and the bottom spar beams, through the fabrication of the spar, to the assembly of the wings in the back, one could not help but be impressed. The assembled wing definitely gave each member of the Pilot Committee a feeling of security and faith in its ability to withstand tremendous loads. The cross-braced baffling within the integral tanks and box construction under the stressed skin assembly met with our admiration and approval. The wing is a single unit from the center of the belly to the wing tip, with the only splice in the spar in the middle of the belly. The nacelles are attached as an integral part of the wing assembly, and the fuselage is literally set on top of the wing and fastened down in position.

The Fuel Tanks are constructed as an integral part of the wing, with the front and rear spars forming the fore and aft bulkheads. The inboard bulkhead ends approximately 10" outboard of the wheel nacelle. The outboard bulkhead is at a line about two-thirds the length of the aileron from the wing tip. The fuel tank is sub-divided by four baffle plates, which are also part of the cross-bracing of the wing. All rivets, bolts and fittings within the tank have been treated before installation with sealant and, in addition, are coated with additional protective sealant on the inside of the tank after assembly. The integral tank construction with a single tank and a single fuel valve for each engine offers some advantages over the multiple tank installations. The minimum of valves, with the one fuel valve and the one cross-feed valve for each tank help eliminate the dangers caused by malfunctioning of electric fuel valves.

The added safety factor of having all fuel carried within the wing and outboard of the nacelle has already been well demonstrated in some nonfatal accidents during the good 5-year service record of the 240. The only fuel contained within or under the fuselage is in the crossfeed line, which is located between the spar cups, and was given special protection.

The 340 utilizes engine exhaust heat for cabin and cockpit heating and for the thermal anti-icing system for the wings and tail surfaces. This method is highly favored by the ALPA over the combustion heaters commonly used by other manufacturers. The heat source for cabin and wing heat is basically the same as on the Convair 240 in that a portion of the engine cooling air is passed through a heat exchanger muff to the cabin heating system and/or through the wing ducts for anti-icing purposes. The difference between the two systems is that in the 340 both augmenter muffs in each engine nacelle supply heated air through a common heat source valve to either the cabin and the tail surfaces or to the wing. This is an improvement; for, by reducing the heat supply to the cabin, it will be possible to supply considerably more heated air

(Continued on Next Page)

for anti-icing purposes. The improvements in the anti-icing system should enable the 340 to handle even more ice than does the 240. The wing heat exhaust in the 340 is in the wing tip rather than in the area of the aileron hinges, as on the 240. This change in exhaust port was required because of the increased length of the fuel tanks in the wing.

One item which has not as yet been installed as standard equipment on most of the 240s, or even on the 340, is a red collision warning light. Pilots have complained of this omission on some air transport planes for years. The closing rate of aircraft is continuously increasing, thereby requiring a greater warning distance. It was gratifying for the pilot group to learn that for the first time on an airliner, the 340 has made provision for the installation of a rotating collision warning light on top of the vertical fin. United Air Lines is now producing such a light for installation on their airplanes, which will be even better than a fixed collision warning light. Such a light should be installed on all Convair 340s before they enter schedule airline service.

The 340 has a fixed position "taxi" light installed on the nose-wheel. This similar type of installation is used by some operators of the 240. It was the unanimous opinion of the pilots inspecting the 340 that the light afforded greater safety and utilization if installed as a noselight for use as an "in-flight" light as well as a taxi light. Some of the 240s are equipped with such a noselight, and pilots flying these airplanes contend that the light is used for checkilng ice or other types of precipitation, for identification purposes, for attracting the attention of converging aircraft, etc., much more than it is ever used for taxiing illumination. All in-flight uses are eliminated by the nosegear installation, as neither gear nor landing lights can be extended above 200 mph, and the nosebear light is useless until the gear is down.

When Taxiing, the nosewheel steered a little harder than on the 240, but part of this was attributed to the extreme and unusual forward CG-loading being used for the tests, and to the maximum gross weight under which the airplane was tested, rather than to any difference in the basic steering mechanism. The nosegear steering cylinder valve has been located on the nosegear cylinder, and the valve is an integral part of the nosegear steering assembly. This should help eliminate the breaking of steering cables such as has occurred on the 240s. This has been further eliminated by the use of larger diameter pullies throughout the cable system. The contra-rotating dual nosewheels very effectively eliminate shimmy. The airplane steers harder at taxiing speeds than does a tricycle gear airplane with a single nosewheel. However, this is not objectionable, and is more than adequately compensated for by the increased safety factor of the dual wheels and of the positive anti-shimmy feature. On the takeoff roll, the airplane is very stable and holds straight down the runway without a tendency to yaw due to engine torque.

Within the limited amount of flying that was done at San Diego, I was satisfied with the flight characteristics of the 340. The 6° 30′ dihedral in the wing improved the in-flight stability of the airplane over that of the 240. The increased dihedral did not seem to affect the single-engine performance of the airplane.

The General Feel of the controls during the takeoff and landings and during flight was similar to the 240. The controls were easily coordinated and the response was firm, but not stiff. This airplane would fly "hands off," and was more directionally stable than is the 240. During a 2-engine, V_2 speed, climbout, the airplane responded readily without any tendency to overcontrol and, in spite of its tremendous acceleration, was easy to stabilize at the desired V_2 speed. As with the 240, V_2 speeds and flap settings must be closely correlated for maximum single engine performance.

During the stall tests, there were no undesirable characteristics noticed, and in approaching to a stall the airplane gave ample warning through the pronounced buffeting. The airplane had good aileron control during a stall, and it was possible to make right and left turns during the stalled condition while the airplane continued to settle. In the "power on" stalls, the airplane did not show any tendency to whip. During approaches and landings, the airplane handled very much like the 240 and responded nicely to power settings and flap management. The larger wheels and lower tire pressure permit smoother landings, with a wider degree of variation than is possible with the smaller high pressure tire on the 240. Prop reversal after landing was easy and normal. A single engine full throttle reverse, as tried on two different occasions, caused no undue yawing, and was readily held by nosewheel steering.

A Feathered Prop, single engine takeoff was accomplished at a gross weight of 47,000 pounds. The takeoff was made under normal conditions, and no attempt was made to anticipate "engine failure." Since V_1 exceeded V_2 for the runway in use, the left engine was cut at the takeoff V_2 speed, and the propeller automatically feathered. The automatic disconnection of the pressurization compressor on the right engine was readily appreciated when seen in operation. The left mixture control cut-off had been failing to stop the engine, so the ignition switch was also cut before the airplane was pulled off the runway. Even including this additional loss of time for the feathering procedure, the airplane climbed out readily at 59½ inches manifold pressure and 2800 rpm on the right engine. The airplane cleared the theoretical 50 foot obstacle at 4800 feet, and at the end of the first mniute's climb, had reached a height of 440 feet. At the end of 2½ minutes of climb under takeoff power, the head temperature reached the maximum allowable 263° and power was reduced to METO power. At this time the climb was temporarily discontinued for a few seconds to permit cleaning up the airplane by retracting the flaps, and to increase the airspeed to zero-flap V_2 speed. At the end of 4 minutes of left engine feathered climb, the airplane had reached an altitude of 1,000 feet above the runway, with a maximum gross weight of 47,000 pounds. This climb data was obtained under relatively favorable flight conditions, and should not be construed as performance available during all weather conditions. The current Civil Air Regulations do not provide for adverse climb conditions throughout the weather scale for all Air Carrier Operations. I am anxious to see the 340 along with the rest of the untested airline airplanes—tested under hot, humid weather conditions .

Previous zero thrust windmilling prop takeoffs clearly showed that a windmilling propeller has an adverse effect on the airflow over that wing, and definitely affects single engine performance. Even though the rpm was set for the calculated zero thrust at varying airspeeds, it was observed that the interruption of the airflow over the air foil had a decidedly detrimental effect on the flight charactertistics. If the propeller feathers properly on an engine failure, the airplane should perform satisfactorily under normal conditions.

If no unforseen characteristics are exposed during scheduled operations, the 340 should prove a very efficient and economical airplane, and one that pilots will enjoy flying.

TO ALL LOCAL EXECUTIVE COUNCIL MEMBERS

August 15, 1952

Dear Member:

Article II, Section 1 of the Constitution and By-Laws of the Air Line Pilots Association provides as follows:

> "The Conventions of the Association shall be held biennially beginning at 10 A.M. on the third Monday of October, provided that such date may be set by the President at any time within a period not to exceed sixty days prior to or later than the third Monday in October."

Article II, Section 3 provides:

> "Notice of Convention shall be sent to each Local Executive Council sixty days prior to the beginning date of a Convention, and notice thereof shall be published in the official magazine of the Association in two succeeding issues immediately prior to the beginning of a Convention."

This is your notice, as required by the By-Laws, that the 12th Convention of the Air Line Pilots Association will begin at 10:00 A.M. on the third Monday of October, or October 20, 1952, in Chicago, Illinois.

The credentials for the delegates and the agenda will be forwarded to you shortly. Councils having matters to come before the Convention should forward them as soon as possible in order that they may be placed on the agenda.

Sincerely yours,

AIR LINE PILOTS ASSOCIATION

Clarence N. Sayen

Clarence N. Sayen, President

Jerome E. Wood

Jerome E. Wood, 1st Vice President

Robert G. Strait

Robert G. Strait, Treasurer

Francis A. Spencer

Francis A. Spencer, Secretary

/vjf
cc: Master Chairmen and Regional Vice-Presidents

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